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available for the preparation of rosaniline, was at one time disposed to consider toluidine the true source of the so-called aniline-red.

But toluidine the purity of which was established by combustion when submitted under the most varied circumstances to the action of the agents already mentioned, does not produce a trace of colouring matter. The subject, which thus appeared to become more and more obscure, was elucidated by a happy experiment.

A mixture of pure aniline and pure toluidine, when heated with mercuric chloride, stannic chloride, or with arsenic acid, instantaneously produced a magnificent red of most intense tinctorial power. This experiment appears to show that the red belongs to both the phenic and toluic series.

I have not as yet pursued my researches further in the new field opened by this experiment.

In conclusion I may be allowed to state that by transforming into oxalate commercial aniline, and especially a specimen of aniline which was furnished to me by Mr. Nicholson as particularly well adapted for the preparation of the red, I have been enabled to obtain considerable quantities of toluidine in a state of perfect purity.

Having thus at my disposal the necessary material, I hope soon to acquire further experimental data for the explanation of the formation of rosaniline.

IX. "On the Measurement of the Chemical Brightness of various portions of the Sun's Disc." By HENRY ENFIELD ROSCOE, B.A., F.R.S. Received June 12, 1863.

The author has applied the method of measurement of the chemical action of sunlight, which Professor Bunsen and he described in a memoir presented to the Royal Society in November last*, to the measurement of the chemical brightness of various portions of the solar disc; and although the observations which have as yet been made are only preliminary, yet he thinks that the results obtained are of sufficient interest to warrant his bringing them before the Society.

Secchi has shown† that the calorific radiation of the centre of

* Abstract, Proc. Roy. Soc. vol. xii. p. 306; Memoir, Phil. Trans. 1863.

† Astron. Nachr. Nos. 806, 833.

the sun's disc is nearly double that from its borders, and that the equatorial regions are somewhat hotter than the polar, whilst observers have long noticed a great difference in luminosity between the centre and edge of the disc.

For the purpose of obtaining a measurement of the relative chemical brightness of various portions of the solar disc, the image of the sun, of about 4 inches in diameter, obtained by a $3\frac{1}{2}$ -inch refractor*, was allowed to fall into a camera placed on the instrument, upon a sheet of standard photographic paper prepared according to the method described in the above-mentioned research. The peculiar property of this standard paper is that it can always be prepared of one and the same degree of sensitiveness, and is perfectly homogeneous. The exposure lasted for from 30 to 120 seconds, the sun's motion being carefully followed by a tangent-screw. After exposure, the shade of tint at several points on the picture was determined by comparison with a graduated photographic strip isolated in the pendulum-photometer, and the chemical intensities corresponding to these shades obtained by reference to the Table given in the memoir above cited. The following numbers give the chemical brightness, thus obtained, at various points on the sun's disc on May 9th, 1863. From these numbers it is seen that the intensity of the chemically active rays at the centre is from three to five times as great as that at the edge of the disc, the chemical rays thus showing a wider variation than the calorific rays exhibited as determined by Secchi. This is doubtless owing to the relatively greater absorption effected by the solar atmosphere on the more refrangible chemical rays.

Chemical Brightness of Sun's Disc on May 9, 1863.

	1. At centre of Sun's Disc.	2. At 15° from edge of Sun's Disc.			3. At edge of Sun's Disc.		
		N. Pole.	Equator.	S. Pole.	N. Pole.	Equator.	S. Pole.
No. 1.	100·0	38·8	48·4	58·1	18·7	30·2	28·2
No. 2.	100·0	52·8	56·6	30·5	41·0

Hence it is likewise seen that on May 9th the chemical brightness of the south polar regions was considerably greater than that of the north polar regions, whilst about the equator the brightness was between that of the poles.

* Kindly placed at my disposal by S. W. Williamson, Esq., of Manchester.

In order to show that the sensitive paper, when exposed to ordinary sunlight, becomes homogeneously tinted, the author appends the readings, taken in the way described, from various portions of a piece of the standard paper used for the sun-pictures exposed for some seconds to direct sunlight.

	Reading.	Deviation from mean.
Portion No. 1 ..	101·4	+0·93
„ 2 ..	100·7	+0·23
„ 3 ..	98·5	—1·97
„ 4 ..	101·6	+1·13
„ 5 ..	99·9	—0·57
„ 6 ..	100·7	+0·23
Mean ..	<u>100·47</u>	

The sun-pictures obtained on the sensitive paper must possess only a slight tint, otherwise the differences in shade cannot be accurately observed; they then exhibit a peculiar coarse mottled appearance, which is not due to imperfections in the paper or the lenses, nor to the action of the earth's atmosphere.

Perhaps these irregular dark and light patches are owing to clouds in the solar atmosphere, and they may have an intimate connexion with the well-known phenomenon of the red prominences.

Mr. Baxendell and the author propose to carry out, according to this method, a regular series of observations of the variation of the relative amounts of brightness on the sun's disc, and they hope before long to be able to present the Society with some further details.

X. "On the Contractility of Healthy and Paralysed Muscles as tested by Electricity." By HARRY LOBB, Esq. Communicated by JOHN SIMON, Esq. Received April 30, 1863.

If a moist conductor from the positive pole of the finer wire of an electro-magnetic battery* be placed upon the skin covering the origin of a healthy muscle, and the moist conductor from the negative pole, upon its belly, and a current of moderate intensity be allowed to pass,

* The apparatus used in these experiments is the small portable machine of M. Duchenne, made by Charrière.